NASA SimLabs News

NEW Airport Workshop

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Welcome New Subscribers!
If you are receiving this newsletter for the first time, SimLabs News is a quarterly publication reviewing current projects at the NASA Ames Simulation Laboratories (SimLabs). NASA SimLabs is comprised of three unique Flight Simulators, an Air Traffic Control radar simulator and a high fidelity Air Traffic Control Tower simulator. The facilities support government as well as private industry in a wide array of applications. To find out more, read on!

1. FAA/NASA/Industry Airport Planning Workshop

If you're involved in airport planning, you don't want to miss the FAA/NASA/Industry Airport Planning Workshop to be held September 12-13, 2006 at NASA Ames Research Center, in Mountain View, California. The workshop theme is "Technology - Smart Solutions for Airport Capacity". The Program has been designed to specifically address today's planning challenges and to present solutions based on success stories.

Case studies of modeling, simulation, and information technology (IT) solutions for airside, terminal and landside issues will be addressed in breakout sessions. Attendees are encouraged to bring their own airport planning challenges to the discussion sessions.

Special IT panels on the Integrated Airport, Airport Security and Future Technology are planned. Tours will be offered of NASA Ames Premier Simulation Facilities, including FutureFlight Central.

Seating is limited to the first 200 registrants, therefore early sign up is recommend. Go to http://www.simlabs.arc.nasa.gov/airport_workshop.html for more information or to register. The website also has information on lodging near NASA Ames with discounted blocks of rooms reserved for workshop attendees.

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2. Simulation GETS (*More*) REAL at SimLabs

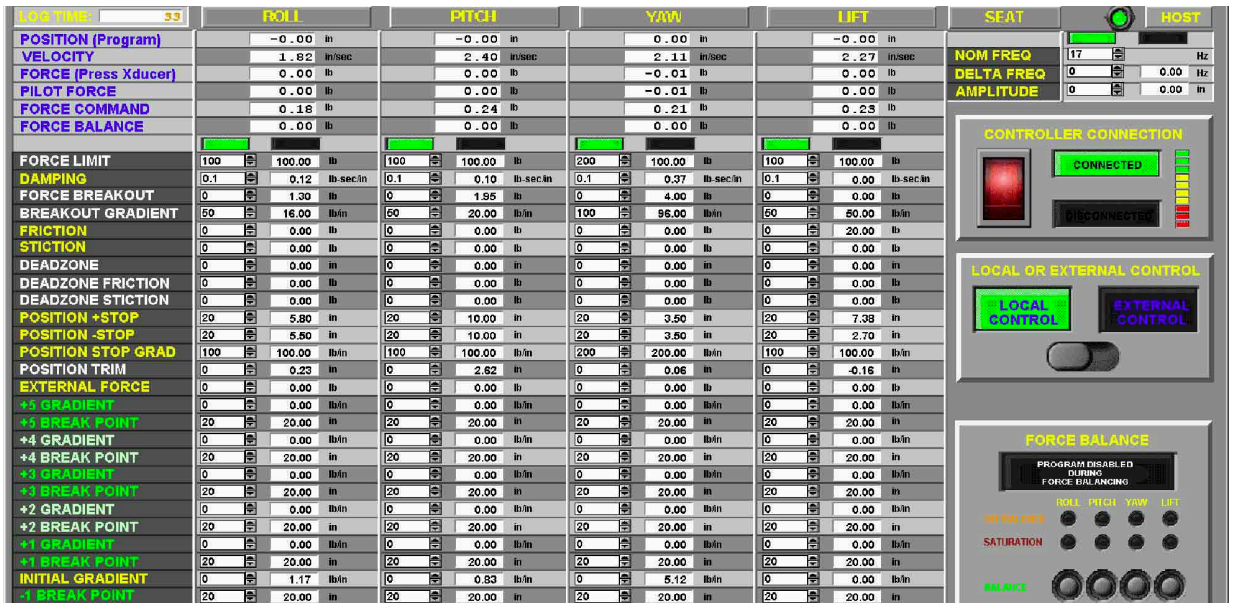
Figure 1. Wheel and Columns

High fidelity flight simulation at NASA's Vertical Motion Simulator (VMS) is getting even better thanks to a new digital force-feel system. The new system, called a digital pilot control loader, provides the pilot with forces on the controls similar to those they would feel in real flight.

The new digital loader replaces the existing analog system. It can provide the basic simulated forces such as a simple spring force, damping, position stops, and friction, plus new features such as stiction (the force required to get something moving), non-linear force gradients, and gravity compensation. A pair of wheel and column pilot control loaders is shown in figure 1.

The new digital pilot control loader uses a personal computer, modeling software, and a graphical user interface. The combination of real-time computers that run at precise frame times and high-speed digital-to-analog converters (DACs)) and analog-to-digital converters (ADCs) provides affordability and better performance over previous versions.

Using object-oriented programming techniques, the user-friendly interface lets users create programs by drawing a functional diagram. The graphical user software allows users to build a simulated hardware panel that has the look of real hardware, with buttons, switches, indicators, and meters (figure 2).



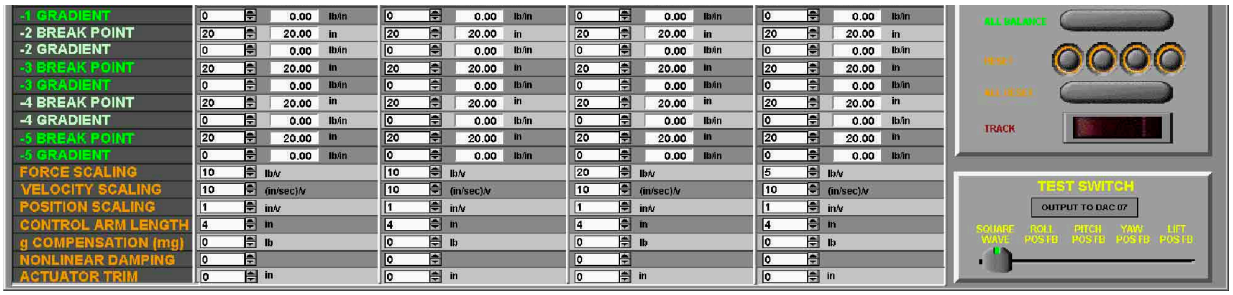


Figure 2. Faceplate User Interface Panel

Measuring the force output on pilot control loaders has always been a problem because the force output also contains inertial effects such as gravity. An inertial compensation circuit was prototyped at SimLabs to compensate not only for gravity, but other inertial effects. The new digital loader software will be able to receive the output of the inertial compensation circuit to provide more realistic force-feel effects and will handle nearly any mechanical characteristic that must be simulated.

Safety is always a primary concern when using systems that can generate high forces and quick movement. An important benefit of the new system is the Controller Connection switch which has a slow turn-on feature that prevents sudden motion.

The digital control loader upgrade to the VMS is an example of NASAís continuous improvement of its world-class facilities which support the Nationís aeronautics and space research.

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3. Tailored Approaches for Reduced Noise and Improved Efficiency

SimLabs' Crew-Vehicle Systems Research Facility (CVSRF) is helping researchers prepare for field studies of enroute descent and approaches designed to minimize noise and maximize aircraft efficiency. The Tailored Approach Program is a joint NASA, FAA, and United Airlines program, utilizing current day technologies in developing real-time, updated Continuous Descent Approach (CDA) into San Francisco International Airport (SFO).

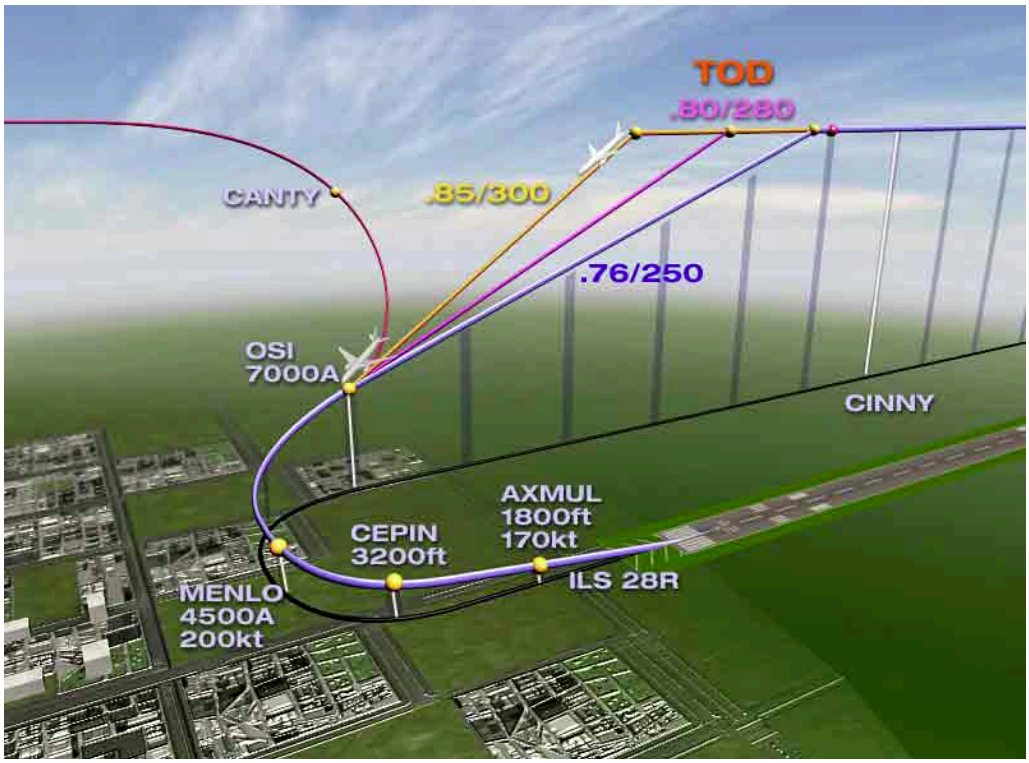

Figure 3. Typical CDA with various speed and altitude constraints

The purpose of this program is to find the most efficient descent for a specific aircraft type. It integrates altitude constraints for terrain avoidance and noise emissions to provide an optimum descent profile for arrival. SFO was chosen because the air traffic from Honolulu to San Francisco afforded testing during late night operations with minimum interference. The CVSRF 747-400 Simulator is being used to identify optimum altitudes and speeds, and to ensure safe crew procedures to be used in the field studies.

These CDAs are continually updated with current winds, up-linked to the Flight Management System (FMS). The FMS includes the flight plans and is a navigational and status system.

At this time the study is concentrating on two types of aircraft, the Boeing 747 and 777. Discussions to include other airlines utilizing different aircraft types, such as the MD-11 and the Airbus, are being held to expand the study.

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4. Thinking of Doing Business with NASA SimLabs?

For more information on what we can do for your needs, contact:

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